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ABSTRACT

This paper presents a study that investigated academic achievement of students (total n=407) guided by student tutors compared with students guided by faculty tutors at the Law School of the University of Limburg, the Netherlands. Two methods of assessing students' achievement on end-of-course examinations were used: expert judgements and propositional analysis. Academic achievement was measured using short-essay questions. Results of both methods used indicated that no differences in achievement occurred. Students guided by student tutors performed as well as students guided by staff tutors. Several explanations are proposed for these results. Among them are: (1) the possibility that the students guided by student tutors spend more time on self-study to compensate for their tutors' lack of expertise, or (2) that the staff tutors perhaps allow students less time and freedom for discussing the subjects in their tutorial groups. Contains 15 references and an appendix containing an example of an essay question for the course, "Unlawful Behavior." (GLR)

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UNDERGRADUATE STUDENTS AS TUTORS: ARE THEY AS EFFECTIVE AS FACULTY IN CONDUCTING SMALL-GROUP TUTORIALS?[1]

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Abstract

In the problem-based first year curriculum of the faculty of Law, small tutorial groups are guided by undergraduate student tutors or staff tutors. In this study, academic achievement of the students guided by student tutors is compared with students guided by staff tutors. Two methods of assessing students' achievement on end-of-course examinations are used: expert judgements and propositional analysis. Results, of both methods used, indicate that no differences in achievement occur. Students guided by student tutors perform as well as students guided by staff tutors. Several explanations are proposed to explain these results.

Undergraduate students as tutors: are they as effective as faculty in conducting small-group tutorials?

Problem-based learning seems to be an answer to the claim that learning should be an active, self-directed process. One of the elements of problem-based learning is the tutorial group. The aims of small-group tutorial sessions are: To analyze problems offered by the faculty, to formulate their own learning goals and to synthesize some days later the information acquired by self study (Schmidt, 1983). In the tutorial group, students learn from, and teach, each other through the exchange of ideas, questioning and explaining the topics at hand. Tutorial groups are guided by a tutor, usually a faculty member. The tutor has several tasks. Primarily, the tutor facilitates the students' learning process. He can do so through probing questions to challenge students' knowledge deeply. He can help students to diagnose their own cognitive processes to become aware of their misunderstandings and misconceptions. He can bring into the discussion examples, metaphors and analogies to stimulate students to apply their knowledge. And he can develop students' reasoning skills by giving them feedback about the way they proceed. Furthermore, the tutor stimulates the members of his tutorial group to analyze and synthesize the problems in procedural proper ways. In addition he has the responsibility to help students keeping the learning process moving forward and co-operating in an appropriate way (Barrows, 1988).

When the problem-based faculties of law, economics and the health sciences at the University of Limburg were confronted with large numbers of students, the teaching staff of these faculties faced the problem of insufficient numbers of staff tutors in relation to the number of tutorial groups. As an economic solution to this problem,

these faculties decided to involve advanced undergraduate students as tutors. Of course, using these undergraduate students as tutors immediately raised the question whether student tutor-guided groups differ from staff tutor-guided groups with respect to achievement. Staff tutors usually have more subject-matter knowledge as compared to student tutors. Staff tutors' expertise is more sophisticated than those of advanced undergraduate students. As experts in their field, staff tutors would be better able to create a learning environment in which modification and reorganization of the cognitive structures of their students becomes possible. Therefore, they would in principle be more able to help their students to get a deeper understanding of the subjects to be studied than students guided by student tutors. Research on peer teaching in the context of problem-based learning, however, shows no differences in achievement between students guided by staff tutors or student tutors (De Grave, de Volder, Gijselaers & Damoiseaux, 1990; Gijselaers, Bouhuijs, Mulder & Mullink, 1987; De Volder, De Grave & Gijselaers, 1985). In all of these studies, achievement was assessed by true-false questions. It is questionable whether the assessment was able to test deeper understanding of the subjects by the students. In one study in which students' achievement was assessed by essay questions, students guided by staff tutors performed significantly better that students guided by student tutors (Moust, De Volder & Nuy, 1989). So, it may be possible that students guided by staff tutors benefit more of this guidance in cases where deeper insight in the subjects is assessed.

In the present study, research is reported on academic achievement of students guided by staff tutors versus those guided by student tutors. Academic achievement was measured using short-essay questions. The answers were analyzed using two methods of scoring. First, the answers to the essays questions were scored by content experts.

Subsequently, a more elaborated analysis called "propositional analysis" is conducted on a sample of the answers (Schmidt, 1982).

Method

Study 1

The study was conducted in the Law School of the University of Limburg, the Netherlands.

Subjects. Subjects were all students attending small-group tutorials guided by student tutors or staff tutors in two courses of the first-year law curriculum. In the first course 230 students participated, guided by seven staff and six student tutors. In the second course, 177 freshman engaged in 18 groups guided by four staff and five student tutors. Each tutor guided two small-group tutorials. Students and tutors were randomly assigned to the tutorial groups. Each course lasted for eight weeks. Students met in their groups twice a week for two hours. Student tutors were recruited by an open selection procedure. Seven third- and fourth-year undergraduate students were selected to fulfill the role of tutor during the first curriculum year.

Materials. At the end of both courses all students had to take an achievement test. These tests consisted of a set of five open questions of the essay format, from which each student had to select three questiones to answer. The test was designed to measure more than factual knowledge. By requiring use of law concepts and rules, and by stressing that full argumentation in the answer was necessary, students were encouraged to give answers showing insight. (see appendix 1 for an example)

Procedure. After the examination the written anonymous answers made were randomly distributed among seven staff members with sufficient content expertise. Every judge independently scored, with the help of a global model answer and a scoring key, the student answers. The answers were scored from 1 (very bad) to 10 (very good). The course grade was based on the mean score on the three answers. The data were analyzed using one-way analysis of variance (ANOVA).

Results

Table 1 shows the results of the end-of-course tests for both courses 1 and 2. There were no significant differences in achievement between students guided by student tutors and students guided by staff tutors. The results of the average mean score in the first course are $F(1, 228) = 0.002$, $p < .96$, the results of the successsive course are $F(1, 175) = 1.42$, $p < .23$.

insert Table 1 about here

The question whether students guided by staff tutors achieve better learning results than students guided by student tutors has to be answered in the negative. Student tutors seem to be able to facilitate students' learning as well as staff tutors. However, the answers of each seperate question were judged by only one content expert. Reliability estimates of the measurement procedure could not be made. So, the assessment of students' answers could be rather subjective (Coffman, 1971). Lack of reliability of measurement could effect the scores of individuals and, hence, the averages found in

the present experiment. So, it was decided to score a sample of the student's answers in a more objective way, that is by propositional analysis (Schmidt, 1982; Schmidt, De Volder, De Grave, Moust & Patel, 1989).

Study 2

Propositional analysis is a method used for text analysis (Meyer, 1975). Propositions are subject-predicate units, each expressing one single idea. The boundaries of two adjacent propositions can be found by identifying appropriate linguistic markers in the text: conjunctions, adverbs, relative pronouns, semicolons, and full stops (Schmidt, et al., 1989). An example is provided by the following protocol(slashes mark boundaries):

> Mrs. Custers agrees with Jongen Inc.(1)// that Jongen Inc. will do up her house in exchange for a payment in money by the Custers' family, (2)// in other words a legal relationship is established between the Custers' family and Jongen Inc. (3)// Jongen Inc. sends Richard van Dalen to the Custers' house. (4)// Richard is employed by Jongen Inc. (5)// Jongen Inc. makes use of the help of other people for the fulfillment of its legal obligation towards the Custers' family (6)// Art. 6.1.8.3. NBW holds Jongen Inc. liable for Richard' behavior,(7)// in the same way as for its own. (8)//. The Custers' family can sue Richard on the basis of art. 6.3.3.1. NBW (9)// .....

Subjects. From the material of the first course 43 answers from each condition and from the second course 74 answers from each condition were randomly selected. A selection was made since the analysis of written protocols is quite laborious.

Procedure. In the scoring process, the answers produced by the subjects were first parsed into propositions by two independent judges. The interrater agreement for this task was 94% Next, each proposition was checked for accuracy. Inaccurate propositions were removed. In addition, a distinction was made between numbers of explanatory and descriptive propositions produced in the accurate answers (Bromage and Mayer, 1981). An explanatory proposition was defined as a statement that is characterized by a juridicial qualification (f.e. the propositions #3, #7, #8 and # 9). All other correct propositions were considered descriptive (f.e. the propositions # 1, #2, #4, # 5 and # 6). According to Mayer (1985), the number of explanatory propositions in free recall is a sensitive measure of depth of integration of subject matter into existing knowledge structures. Interrater agreement for this task was 81%. Differences of opinion between judges were solved by discussion.

Results

The results of the propositional analysis: the number of accurate, descriptive and explanatory propositions are shown in Table 2 and 3. Differences between means were tested by one-way analysis of variance (ANOVA).

insert Tables 2 and 3 about here

The results suggest that the answers of the first course show no differences between both conditions neither for the total number of accurate propositions ($F(1, 84) = .06$, $p < .81$), nor for the descriptive propositions ($F(1, 84) = 1.66$, $p < .20$) and the explana-

tory propositions (F (1, 84) = 0.03, p < .87). The results of the proposition analysis in the successive course show a similiar pattern. Number of accurate propositions is (F 1, 146) = .01, p < .93), number of descriptive propositions is (F (1, 146) = 3.50, p < .06) and number of explanatory propositions is F (1, 146) = .39, p < .54). If we agree with Mayer (1985) that the number of explanatory propositions suggest the depth of integration of the subject matter, than the question whether students guided by staff tutors achieve better learning results than students guided by student tutors must be answered in the negative.

General Discussion

In this paper an experiment was described in which staff members as tutors were compared to third- and fourth- year undergraduate law students as tutors in two courses of the first curriculum year of the law faculty. Student's achievement was assessed by essay questions at the end of the course. The results suggest that students guided by staff tutors did not perform better than students guided by student tutors. A more elaborated analysis of a sample of student's answers, through propositional analysis, also indicated that there were no significant differences. These results indicate that student-tutors are able to fulfill the tutor role as well as staff members. Several explanations are possible for this finding. One possible explanation would be that the students guided by student tutors spend more time on self study to compensate their tutors lack of expertise. Our own research suggest that this may be the case, at least partially. The same group of students filled out weekly a study time registration form. On this form students keep track of their time-on-task. Results of this research indicate that in the first course students guided by student-tutors spend significantly more time on self study

than students guided by staff tutors. In the second course there were no differences. Another explanation would be that staff tutors perhaps allow students less time and freedom for discussing the subjects in their tutorial groups. Bender (1983) and Webb (1983) found that staff teachers took 46 to 61 % of the discussion time of the groups they guided. In an instructional setting where there is more equality and mutuality between students and tutor, students may feel more free to express opinions, ask questions and speculate about the problem-at-hand. When staff tutors take the floor most of the time, students are not able to formulate their own ideas, to question and explain subject-matters to each other. A third possible explanation would be that student tutors behave in another way than staff tutors. Research by Moust (in press) indicates differences in the way staff and student tutors handled their expertise, their authority and the interpersonal relationship to the members of the tutorial groups.

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Appendix 1. **An example of an essay question, course "Unlawful behavior."**

Richard van Dalen is working as a house-painter, employed by Johnsons' Painting Inc. He is working for several weeks at the estate of the Custers' family. The house has to be painted thoroughly, from the inside and the outside. During the paintworks the Custers' family is on holidays in Switzerland. After several days Richard discovers that the Custers' family is a glassware buff. The family has a valuable collection displayed in some showcases in the living room.
By coincidence Richards'cousin Alfred is also very interested in antique glassware. To do his cousin a favor, one evening Richard suggests to go to the Custers' house and take a look. Cousin Alfred is very pleased with this offer. Since Richard has a key of the Custers' house, they get inside without troubles. After they have admired the antique glassware for a while, an accident happens. Richard slips and falls, by unknown causes, with all his weight against one of the showcases. The showcase with all the antique glassware smashes on the floor in a thousand pieces.

a. Indicate whether the Custers' family can claim for damages by Richard van Dalen or Johnsons' Painting Inc.?
Give a motivated answer.

b. Indicate who has to pay the damage in the end?
Give a motivated answer.

Table 1. Means and standard deviations of the students' total test scores in the the first and second course of the first year curriculum of the faculty of law.

	course 1			course 2		
Experimental condition	N	M	Sd	N	M	Sd
Students guided by staff tutors	125	5.6	1.6	82	5.2	1.7
Students guided by student tutors	105	5.5	1.5	95	4.9	1.6
Total	230	5.5	1.6	177	5.1	1.6

Table 2 Average number of Accurate, Descriptive and Explanatory Propositions in the first course.

	Accurate prop.		Descriptive prop.		Explanatory prop.	
Group	M	Sd	M	Sd	M	Sd
Students guided by staff tutors (n = 43)	24.6	13.4	3.7	3.3	21.0	11.0
Students guided by student tutors (n = 43)	25.3	12.6	4.7	4.2	20.6	10.3
Total (n = 86)	25.0	12.6	4.2	3.8	20.8	10.6

Table 3 Average number of Accurate, Descriptive and Explanatory Propositions in the second course.

	Accurate prop.		Descriptive prop.		Explanatory prop.	
Group	M	Sd	M	Sd	M	Sd
Students guided by staff tutors (n = 74)	21.1	10.1	4.0	4.3	17.1	9.6
Students guided by student tutors (n = 74)	20.9	10.1	2.9	3.1	18.0	9.4
Total (n = 148)	21.0	10.1	3.5	3.7	17.5	9.5